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ABSTRACT

Biased social information processing has been solidly linked to aggressive behavior in children. Additionally, attributional tendencies, the tendency to overattribute deliberately hostile intentions to others, have been shown to distinguish aggressive and nonaggressive male youth. In order to reduce aggressive males' tendency to attribute hostile intentions to peers following ambiguous, negative interactions, an attribution retraining program was implemented in an urban, public elementary school. Subjects, 101 aggressive and nonaggressive African American boys in grades three through five, were randomly assigned to the attributional intervention, to an attention training program, or to a control (no treatment) group. Subjects' reaction to hypothetical peer provocation, teacher ratings of subjects' aggressive behavior, and referrals for formal disciplinary action were assessed and evaluated for statistical and clinical significance. Compared to subjects in the control or attention training groups, aggressive subjects in the attributional intervention group showed significant reduction in bias to attribute hostile intent. These subjects were also rated by their teachers as less reactively aggressive following treatment, and less likely to receive disciplinary action. Nonaggressive subjects experienced no negative effects due to program participation. (ET)

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Attribution Retraining and Behavior Change Among Highly Aggressive and Nonaggressive African-American Boys

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ABSTRACT

Attributional tendencies have been shown to distinguish aggressive and nonaggressive male youth. Thus an attribution retraining program was implemented to reduce aggressive males' tendency to attribute hostile intentions to peers following ambiguous, negative interactions. African American elementary school boys (N=101), aggressive and nonaggressive, were randomly assigned to the attributional intervention, an attention training program, or a no-treatment control group. Subjects' reactions to hypothetical peer provocation, teacher ratings of aggressive behavior, and referrals for formal disciplinary action were assessed and evaluated in terms of both statistical and clinical significance. Compared to students in the attention training and control groups, aggressive subjects in the attributional intervention showed a significant reduction in the bias to attribute hostile intent to peers in hypothetical ambiguous situations. Intervention participants were rated as less reactively aggressive by their teachers following treatment, and were less likely to be sent to the office for disciplinary action.

Attribution Retraining and Behavior Change

Among Highly Aggressive and Nonaggressive African-American Boys

Excessive levels of aggressive behavior in childhood have been found to be extremely stable over time (Olweus, 1979; Lefkowitz, Eron, Walder, & Huesmann, 1977) and to presage a host of negative developmental outcomes. Youth who display unduly high levels of aggression in school settings, males in particular, have been found to manifest significantly higher rates of juvenile delinquency (Loeber and Stouthamer-Loeber 1987), poor overall school adjustment, greater than average rates of school drop out, and higher than average rates of referral for clinical mental health interventions (Cox & Gun, 1980; Kupersmidt & Coie, 1990). Excessive aggression in childhood has also been found to predict adult antisocial behavior and criminality (Berkowitz, 1989).

Minority youth are an especially compelling population of concern in school based aggression research. Although African-American children represent 25% of the national public school population, they comprise 40% of all suspensions and expulsions (Reed, 1988). Almost half (45%) of all suspensions and expulsions are prompted by school staff perceptions of excessive levels of verbal or physical aggression, most often in the context of peer interaction (Reed, 1988). The tragedy is that although suspension may provide symptomatic relief for schools, it does not address the root causes of aggressive behavior and banishes those children who are most in need of the benefit of a strong academic foundation, a caring school environment, and positive peer relations.

Recent research has produced a solid body of data linking biased social information processing with deviant levels of aggressive behavior in childhood (see Dodge & Crick, 1991, for a review). One singularly robust finding among aggressive male youth has been the presence of a hostile attributional bias, or

the tendency to overattribute deliberately hostile intentions to others (Nasby, Hayden, & DePaulo, 1980; Dodge, 1980). For example, if asked to envision being bumped by a peer while walking down the hallway at school, the excessively aggressive child is more likely to state that the bump was "on purpose", in the absence of any additional social information. The average child is likely to presume accidental peer intent (Waas, 1988), or to request additional information (Dodge & Newman, 1981).

This attributional bias manifests itself among reactively aggressive youth in the tendencies to engage in rapid social decision-making, (Dodge & Newman, 1981), to selectively recall presented social cues (Dodge & Frame, 1982; Dodge & Tomlin, 1987), and to endorse high levels of peer-directed retaliatory aggression, without regard to the presented social cues (Waas, 1988). Further, several theoretical models have been put forth which postulate a causal role for these attributional biases in shaping aggressive retaliation (e.g., Dodge, 1986; Dodge & Frame, 1982; Ferguson & Rule, 1983; Spivak & Shure, 1982).

The growing concern over the long-term societal consequences of childhood aggression and the burgeoning data on the social cognitive determinants of aggressive behavior have prompted an upsurge in the development of cognitive interventions for aggression reduction (Kazdin, 1987; Pepler & Rubin, 1991). However, few programs have focused specifically on retraining attributions of aggressive youth. Those which do incorporate attributional components (e.g., Pepler, King, & Byrd, 1991; Guerra & Slaby, 1990) typically focus on multiple interpersonal processes and skills simultaneously. Thus it is difficult to determine the impact of any single component on the reduction of aggressive behavior.

This paper reports the results of the first phase of an intervention package which, in contrast, embodies a constructive treatment strategy (Kazdin, 1980) and focuses on attributional change as the starting point. The wealth of empirical evidence connecting biased attributions to inappropriately aggressive responses provides an excellent rationale for concentrating on attribution retraining as an initial focus in the development of a treatment program for the reduction of aggression. Further, a solid theoretical framework is presently in place for analyzing the role of attribution retraining in changing behavior (e.g., Weary, Stanley, & Harvey, 1989). Initially isolating a single feature of interactions which has been linked to aggressive behavior, i.e., attributional bias, permits a direct evaluation of the basic treatment component.

Based on the assumption that the aggressive child's attributional bias initiates a sequence of events leading to maladaptive responses, aggression reduction is more efficiently accomplished earlier rather than later in the motivational sequence. For example, when standing in the lunch line, a student would likely engage in an attributional search to explain why a peer had bumped into his arm, causing his milk to spill. If the student believed that the peer deliberately bumped him and caused his milk to spill, that belief would represent an attribution to controllable causes. Such an attribution would likely generate feelings of anger, and produce an aggressive response. A recent investigation examining this proposed cognition-affect-behavior sequence in African-American early adolescents (Graham, Hudley, and Williams, 1992) found that aggressive youth made more biased attributions of hostile intent on the part of a hypothetical peer provocateur, reported more anger, and were more likely to endorse aggressive behavior than were a comparable group of nonaggressives.

The school-based program for primary prevention of clinical dysfunction was implemented with male youth identified by both teachers and peers as excessively, though subclinically, aggressive and a smaller number of average student participants (Hudley & Graham, 1993). These average students were included to negate potential stigmatization of research subjects, to give aggressive participants the opportunity to interact with positive peer models, and to allow nonaggressives the opportunity to reappraise their attitudes and behaviors directed toward the aggressive students as they progressed through treatment. Such interaction is considered critical to generalization of treatment effects (Bierman, 1986; Asher, 1985), and necessary to counteract the debilitating effects of a reputation for aggressive behavior (Dodge & Frame, 1982).

The nonaggressive subjects also served as a unique source of data. The measurement of treatment efficacy in psychotherapy research has been redefined in recent years. The construct of clinically significant change (Jacobsen & Truax, 1991) implies movement on the part of treated subjects into the range of normal functioning as a result of participation in treatment. To most accurately assess clinical significance, comparative data are required from a normative sample. The design of this intervention study allowed such data to be collected.

There is a related and continuing concern in the intervention research literature regarding negative effects of intervention on the normally developing child (Kazdin, 1987). Programs of primary prevention for antisocial behavior have sometimes demonstrated adverse effects on subjects' behavior (McCord, 1978), particularly among African-American youth (Hackler & Hagan, 1975). The emergence of possible deleterious effects could be closely monitored in this study, as nonaggressive youths participated fully in the program of intervention. Results of this intervention which are pertinent to statistically significant change

among aggressive subjects have been reported elsewhere (Graham & Hudley, in press). The specific purpose of this report is therefore to present comparative data for nonaggressive and aggressive subjects which delineates the effects of a program for primary prevention of clinical levels of aggressive behavior. Three specific questions were addressed. Can the identified attributional biases of highly aggressive male youth be retrained within the range of normal functioning as a result of treatment? Is the behavior of these youth after treatment comparable to normally functioning youth? Does treatment negatively affect the behavior of average male youth?

Method

Subjects

African-American boys in grades three through five at two urban public elementary schools in greater Los Angeles were screened for possible participation (N=271). A total of 17 classroom groups participated in initial screening. The student body at each of the sites was comprised of predominantly (80% or more) African-American students. Two procedures constituted the method of sample selection: peer assessment and teacher ratings of aggressive behavior.

Peer nomination/assessment. During the spring semester, 1990, all students with parental consent completed a group-administered sociometric questionnaire within their classrooms. Two African-American female experimenters asked students, with the aid of a class roster, to write down the names of the three peers they liked most within their classrooms, the three peers they liked least, and three peers who exemplified each of five behavioral statements. These included three aggressive (i.e., starts fights, loses temper, disrupts the group) and two prosocial behaviors (i.e., works well with other students, is helpful to others). Students were encouraged to be honest, and were assured of

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confidentiality. After finishing the sociometric questionnaire students completed word puzzles as a distractor exercise, and prizes were awarded to four students in each class.

Teacher ratings. At the same time, each of the 17 classroom teachers completed the 8-item aggression subscale of the Teacher Checklist (Coie and Dodge, 1988; Coie, 1990) for all students enrolled in his or her class. The items represent typical forms of peer directed aggression (e.g., "This child says mean things to peers; This child overreacts to accidental hurts with anger and fighting"), and each was rated on a five point scale (1= "not at all", 5= "very much"). This combination of peer assessment and teacher rating has been shown to be a reliable and valid indicator of childhood aggression in school settings (Dodge, 1980; Coie & Dodge, 1988).

Selection criteria. The peer nominations each child received for each of the seven items were first summed and standardized (Z scores) within classrooms to calculate nomination totals. Standardized scores were used to equalize nomination totals across classes of varying sizes (range: 29-32 students). From these totals, each child received a social preference score calculated as liking minus disliking nominations, an aggression score calculated as the total of nominations for the three aggressive behavior items, and a prosocial score calculated as the total of nominations for the two prosocial items. Teacher ratings were summed to yield a total aggression score (range 8-40), with higher numbers indicating more perceived aggressiveness.

African-American male students best fitting the following multiple criteria were classified as aggressive: placement above the class median on teacher ratings of aggression (n=149), social preference Z score of less than -1 (n=104), and at least twice the number of peer nominations for aggressive than for

prosocial behavior (n=96). Those who placed at or below the class median on teacher ratings of aggression (n=122), received a social preference Z score greater than 0 (n=89), and received 1.5 times the number of peer nominations for prosocial behavior than for aggression (n=63) were classified as nonaggressive. The criteria for inclusion into the nonaggressive sample was less stringent based on the belief that the nonaggressive group should represent the average, rather than the socially gifted, popular student.

From an initial eligible pool of 78 aggressive and 42 nonaggressive African-American males enrolled in regular education, 24 aggressive and 12 nonaggressive students were randomly assigned to each of the three treatment levels: experimental intervention, attention training, and no-treatment control (N=108). However, during the four month course of the study, 101 students actually completed all phases of the study. Initially, aggressive (M age = 10.5) and nonaggressive (M age = 10.3) participants differed significantly on all four variables used in sample selection. These included: teacher ratings - aggressives (M=22.87 sd=8.91), nonaggressives (M=11.64 sd=5.38), (t[106]=7.85, p<.001); social preference - aggressives (M=-2.02 sd=1.34), nonaggressives (M=1.68 sd=2.41), (t[106]=6.59, p<.001); peer rated aggression - aggressives (M=19.23 sd=12.17), nonaggressives (M=2.17 sd=1.88), (t[106]=9.39, p<.001); peer rated prosocial behavior - aggressives (M=1.93 sd=2.31), nonaggressives (M=6.72 sd=5.14), (t[106]=7.72, p<.001).

Treatment

Students in the attribution retraining and the attention only conditions were seen in small groups (n=6, 4 aggressive and 2 nonaggressive) by one of two African-American female experimenters, both educators with experience in small group instruction. Six groups of each intervention type met twice weekly during

the school day for six weeks, during the first quarter of the school year following sample selection. Each experimenter individually conducted three attribution and three attention groups, distributed across both sites. All intervention activities were conducted at the school site which the participating students attended.

Attribution Retraining. The experimental group received a tripartite, manualized intervention, the BrainPower Program, specifically created for this project to reduce an attributional bias to presume hostility in peer interactions. Development of this intervention was guided by recent formulations of information processing mechanisms involved in peer directed aggression (Dodge & Crick, 1990), as well as the linkages between cognition and behavior as predicted by attribution theory (Weiner, 1986).

Aggressive children are less accurate in their interpretation of a peer's intent (Dodge, Murphy, & Buschbaum, 1984), and they make these interpretations impulsively (Dodge & Newman, 1981). Therefore, the initial component of this program trained students to detect intentions by searching for and properly categorizing verbal and behavioral cues emitted by others. For example, students produced four short video scenarios to demonstrate their understanding of the difference between hostile, accidental, prosocial and ambiguous intent.

Aggressive children are also most prone to retaliation (Dodge, 1980) and biased recall of social cues (Dodge & Frame, 1982) in ambiguous social situations, possibly because they attribute negative outcomes to causes controllable by the other party (Weiner, 1986). The second component was designed to increase the cognitive availability of attributions to uncontrollable causes, when the peer's intent was portrayed as ambiguous. For example, students role played an ambiguous negative outcome, after which the group brainstormed

possible causes, categorized them as deliberate or unintentional, and selected the most reasonable explanation.

The third component linked students' repertoire of behaviors appropriate for unintentional social outcomes to ambiguous situations by generating decision rules which dictate when to enact these particular behaviors (i.e., "When I don't have the information to tell what he means, I should act as if this were an accident"). For example, students supplied appropriate behavior to unfinished stories of accidental, negative outcomes.

The program focused entirely on peer directed social behavior, and used familiar playground situations typical of elementary school social life. A full scope and sequence of the curriculum has been reported elsewhere (Hudley, 1991). The presentation was entirely task focused, with no reference to an individual student's behavioral difficulties. Throughout treatment, the personal and social benefits of nonaggressive responding were emphasized in order to enhance participants' motivation to spontaneously use trained skills (Bierman, 1986).

Attention training. To control for the effects of special attention and group participation, attention only students received a program to enhance problem-solving skills: Building Thinking Skills (Black & Black, 1984). Using an instructional format similar to that employed in the experimental treatment, students practiced tasks of nonsocial problem solving, and produced four short "training videos" on critical thinking skills. The attention training curriculum focused entirely on nonsocial problems, in order to avoid overlap between content covered in the experimental and attention only groups.

Treatment procedures for each of the two intervention types were standardized during a two week training period prior to the onset of the study, and fidelity was maintained with regular research team meetings for the duration

of the project. The intervention group leaders met initially for six sessions (16 hours total) before meeting with their student groups. In these sessions, both intervention curricula were explained and demonstrated in detail, and both leaders had the opportunity to lead simulated lessons. Leaders were trained to minimum performance criteria as established by the author of the experimental curriculum. Leaders were also able to discuss implementation concerns during weekly research team meetings throughout the study. An expectancy bias was avoided by ensuring that group leaders remained blind to the aggression status of their students for the course of treatment.

No-treatment control. Students in the no-treatment control condition participated in pre-and post-intervention assessment only. In all other respects, their school routine was unchanged.

Measures

Three types of data were collected prior to intervention and again at the close of the program to evaluate intervention effects: responses to hypothetical interpersonal situations, teacher ratings of behavior, and formal referrals for school disciplinary action.

Hypothetical scenarios. Five scenarios were created, each of which describes an interaction between a hypothetical peer and the student and results in a negative outcome for the student. Negative outcomes included destruction of property (e.g., a ruined homework paper), physical harm (e.g., a hard push by a peer while playing baseball), and social rejection (e.g., a planned meeting with a peer who never showed up). In the homework paper story for example, the student imagined that while walking onto the school playground one morning, he set his notebook on the ground to tie his shoelace. An important homework paper fell out, and another student walking by stepped on the paper, leaving a

muddy footprint right across the middle. One of four intent manipulations then completed the scenario. In the ambiguous story, the peer simply looks at the paper and back to the child, while in the hostile scene the peer laughs and says "Tough luck". In the accidental story the peer apologizes and states that he did not see the paper, and in the prosocial version the peer explains that he was trying to save the paper from flying into the street.

Students were individually read five scenarios, counterbalanced across participants, one each of accidental, hostile, and prosocial intent and two of ambiguous intent in a single session prior to the intervention program. Five unfamiliar scenarios were readministered to each subject in a single post-intervention session with an African-American female experimenter unrelated to the intervention program.

For each scenario, four questions probing the student's judgment of intent (e.g., Do you think he did this on purpose?) and three questions eliciting his affective response (e.g., Would you be angry with this person?) were rated on seven point scales with higher numbers representing more affirmative responses. Participants also selected one from among six behaviors ranging in aggression intensity and assigned value from "Have it out right then and there" (value of 6) to "Do something nice for him" (value of 1).

Prior research (Graham, Hudley & Williams, [redacted]) indicates that the hypothetical scenario questionnaire discriminates clearly between students fulfilling the previously described criteria for aggressives and nonaggressives. These procedures have been designed specifically for this program of research and represent an adaptation and extension of methods used extensively in the past decade to identify and describe the hostile attributional bias which is the focus of this study (eg. Dodge, 1980; Dodge & Frame, 1982; Dodge & Coie, 1987).

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Teacher ratings. Teacher ratings on all participants were collected using three subscales of Coie's (1990) Teacher Checklist. Each student was rated on the eight item aggression subscale also completed by the previous year's teacher for the purpose of sample selection, a five item prosocial behavior subscale, and a four item academic performance subscale. Total scores for each subscale were computed separately as the sum of the individual items. The aggression subscale (described previously in sample selection methodology) also decomposes into derived scores for both reactive and proactive aggression. As this intervention targeted reactive aggressive behaviors, specific scores for reactive aggression were also calculated. Each subject's current teacher completed rating scales the week prior to the onset of the program and again the week following its termination. Although teachers were aware that some students were removed from class to participate in the study, they were blind to students' intervention group assignments.

Disciplinary referrals. A records search was conducted at each school site to determine the number of times participants were referred to an administrator's office for formal disciplinary action. Administrative logs were reviewed for the school year immediately preceding the experimental intervention (1989-90) and for the school quarter immediately following the intervention (January - March, 1991).

Results

Attrition over the four month duration of the study reduced the aggressive sample by six, and the nonaggressive sample by one, for a final N of 101. Four aggressive subjects in the attributional intervention moved away, and one nonaggressive student withdrew due to scheduling conflicts. Two aggressive attention training subjects also withdrew because of scheduling conflicts.

Pretest data for the original sample did not differ significantly from the reduced sample. Thus the data of 31 subjects in the attributional intervention (20 aggressive and 11 nonaggressive), 34 attention training subjects (22 and 12), and 36 control group subjects (24 and 12) were analyzed and constitute the content of this report.

Hypothetical Scenarios

The four items eliciting subjects' judgments of peer intent demonstrated high internal consistency at both pre-test and post-test (both Chronbach's α's=.88), as did the three measures for ratings of anger (Chronbach's α pre=.81, post=.79). The multiple ratings of intent and anger were therefore combined into single indices of intentionality and anger. Preliminary analysis revealed no significant differences among intervention groups for pre-intervention ratings. Pre-test ratings of intentionality, anger, and preferred behavior were therefore examined separately in 2(status) X 4(causal scenario condition) repeated measures analyses of variance (ANOVA), with scenario type as the repeated factor.

Prior to the onset of intervention, all of these youth were quite able to incorporate intent information for those scenarios in which such information was presented. Significant differences between aggressive and nonaggressive subjects appeared only in ratings for the ambiguous scenarios. Status by scenario interactions were significant for intent, $F(3, 297) = 16.10$, $p<.001$; anger, $F(3, 297) = 9.11$, $p<.001$; and behavioral choice, $F(3, 297) = 9.11$, $p<.001$. Aggressives were more likely to rate the ambiguous scenario as more hostile than any other except the hostile scenario, and nonaggressive subjects most often rated the ambiguous scenarios as similar to the accidental and prosocial scenarios. Aggressives were more likely to infer hostile intent (Ms = 5.16 vs. 2.53; ($I[99] = 8.47$, $p<.001$), report higher levels of experienced anger (Ms =

5.32 vs. 3.61; ($\underline{T}$[99] = 4.87, $\underline{p}$<.001), and endorse retaliatory aggression (Ms = 4.17 vs. 2.73; ($\underline{T}$[99] = 4.79, $\underline{p}$<.001) in the ambiguous scenario condition (see Table 1).

To best assess treatment effects, post-intervention data using hypothetical scenarios were analyzed as a function of status and intervention group. Change scores for each variable were first calculated by subtracting post-intervention from pre-intervention ratings. Therefore larger positive numbers indicate greater reductions in attributional bias, reported anger, and retaliatory aggression. These three indices of change (cognitive bias, anger, and retaliatory behavior) were then analyzed in separate 2(status) X 3(intervention group) multiple analyses of variance with scores for the four scenario types as the multiple dependent variables.

In this analysis, a significant multivariate (MANOVA) interaction between status and intervention group was detected for change scores in intent judgments ($\underline{F}$[8, 182] = 3.13, $\underline{p}$<.01), which was explained entirely by the univariate significance of the ambiguous scenario ($\underline{F}$[2, 95] = 5.44, $\underline{p}$<.01). An analysis of means and parameter estimates revealed that change scores for aggressive subjects in the experimental group were significantly greater in a positive direction than scores of either aggressive subjects in the two comparison groups or all nonaggressives. In other words, intentionality ratings of nonaggressive subjects as well as aggressive subjects in the two comparison groups did not change significantly as a function of intervention type. However, aggressive subjects in the experimental treatment groups showed sizeable reductions in attributions of hostile intent (see table 1). Change scores for ratings of anger and retaliatory behavior were also greatest for experimental aggressives, though mean differences did not demonstrate multivariate significance.

Insert Table 1 about here

Clinical significance. Although statistically significant differences between group means attest to the presence of a reliable treatment effect, they shed no light on the magnitude of change for individual students. As stated earlier, a measure of clinically significant change provides information regarding the movement of individual subjects out of the dysfunctional population and into the functional, or normative population (Jacobsen, 1988). Therefore, a cutoff score for clinical significance was calculated to assess the ability of this treatment to facilitate the movement of subjects into the average range of aggressive behavior.

Following Jacobsen and Truax (1991), clinically significant change was operationally defined as a post-intervention score which falls closer to the mean of the functional, or normative population, than to the mean of the dysfunctional population. The pre-intervention responses of nonaggressive subjects constituted the normative sample for purposes of computation of the cutoff score. By using pre-intervention responses, it was also possible to evaluate change as a function of participation in treatment among the nonaggressive subjects as well.

In addition, since the distributions of aggressive and nonaggressive subjects' scenario ratings are overlapping (see Table 1), it was also necessary to calculate a reliable change index (Christensen & Mendoza, 1986). In the case of overlapping distributions, a subject's score may indeed cross a cutoff point for clinical significance without being statistically reliable, making the movement from dysfunctional to functional population entirely illusory.

A comparison of the three intervention groups revealed that the greatest proportion of clinically significant and reliable improvements in ratings of the ambiguous scenarios was achieved by the experimental group aggressive students. Sixty per cent of the experimental group subjects showed significant, reliable reductions in attributions of hostile intent, compared to 4% of the attention only group and 8% of the no attention controls. Ratings of experienced anger and behavioral choice show a similar, if less dramatic difference in favor of the experimental group aggressive students (see Table 2).

Insert Table 2 about here

Among nonaggressive students, no clinically significant, reliable reductions occurred in attributions of hostile intent or aggressive behavioral choice, as the great majority of these subjects' scores remained below the cutoff point from pre- to post-intervention. One subject in the no-treatment condition did significantly reduce his ratings of experienced anger. In assessing potential negative effects of treatment on nonaggressive subjects, no students in the experimental group exhibited negative change in judgments of a peer's intent or preferred level of aggressive retaliation. One subject, however, significantly increased his rating of anger. Among the subjects in the comparison groups, one displayed an increase in judgments of hostile intent, and one an increase in ratings of anger.

Teacher Ratings

Student scores both pre- and post-intervention were calculated for the overall aggression scale and the reactive aggression, prosocial behavior, and school performance subscales, as totals of the individual items on each scale or

subscale. Scores for subjects were then analyzed in a 3(intervention group) X 2(status) multiple analysis of variance (MANOVA) with the three rating subscales as the multiple dependent variables. A separate analysis (ANOVA) was conducted on the overall aggression score.

Prior to intervention, a highly significant multivariate main effect of status (($F[3,92] = 19.66$, $p<.001$) was detected for the three teacher rating subscales. All subjects designated aggressive based on information from the previous school year were rated by their current teachers as more prone to aggressive retaliation ($F[1,94] = 32.75$, $p<.001$), performing less well in the classroom ($F[1,94] = 18.62$, $p<.001$), and displaying fewer prosocial behaviors toward peers ($F[1,94] = 14.44$, $p<.001$), when compared to all subjects designated nonaggressive. In addition, aggressive subjects were rated more aggressive overall ($F[1,94] = 52.80$, $p<.001$), in comparison to nonaggressives. No significant intervention group differences were detected in pre-test ratings.

At the close of intervention, change scores were also calculated for each teacher rating scale by subtracting post-intervention from pre-intervention ratings. Larger positive numbers indicate greater perceived change in a positive direction for ratings of aggression and academic performance, while larger negative numbers indicate increases in prosocial behavior. These scores were then analyzed in a manner similar to pre-intervention ratings.

Teacher ratings of overall aggression differed significantly by intervention group ($F[2,94] = 3.42$, $p<.05$). Subjects in the experimental intervention group achieved the greatest changes, with aggressive subjects demonstrating the greatest changes overall. Teacher ratings on the three subscales displayed significant differences by intervention group for the reactive aggression scale only ($F[2,94] = 3.36$, $p<.05$). Again aggressive

subjects in the experimental group achieved the greatest change scores among all groups (see table 3).

Insert Table 3 about here

Clinical significance. Among aggressive subjects, those exposed to the experimental treatment displayed clinically significant, reliable improvements in teacher ratings of both reactive and overall aggression at a rate more than double that of either comparison group (see table 4). Additionally, aggressive subjects in both the no-treatment and attention-only groups received significant and reliable increases in teacher ratings of both reactive aggression and overall aggression. However, only one student in the experimental condition received an increase in ratings of overall aggression, and no increases were observed for this group in ratings of reactive aggression. Improved teacher ratings of prosocial behavior were also evident for experimental and no-attention control aggressive subjects. No clinically significant effects were detected for ratings of academic performance.

Insert Table 4 about here

None of the nonaggressive students received clinically significant, reliable reductions in teacher ratings of reactive aggression, again because teacher ratings typically remained well below cutoff levels. One student each in the experimental and attention-only groups received significant, reliable increases in teacher ratings of reactive aggression. In addition, one nonaggressive subject in the no-attention control group showed a significant

decrement in teacher ratings of prosocial behavior. Again, no clinically significant effects were detected for ratings of academic performance.

Office Referrals

Finally, mean number of office referrals differed by status ($F[1,94] = 51.09$, $p<.001$), as well as by intervention group ($F[2,94] = 3.77$, $p<.05$) prior to the onset of intervention. Aggressive subjects were three times as likely to be referred to the office as nonaggressives, and experimental aggressives were referred more often than all other aggressives by a factor of 1.5. Change scores were again calculated by subtracting post-intervention office referrals from pre-intervention referrals; thus higher positive numbers indicate greater reductions in frequency of referral. Although experimental group aggressives displayed the greatest absolute reductions in office referrals, differences by group were not significant. Differences by status remained highly significant for change scores ($F[2,94] = 14.48$, $p<.001$).

Clinical significance. Although aggressive subjects continued to be referred to the office at significantly higher rates, only those in the experimental treatment groups showed clinically significant, reliable changes in office referrals. Twenty per cent exhibited reductions in office referrals from pre- to post-intervention, while only half that number demonstrated increases during the post-intervention assessment period. Neither significant increases nor reductions were found for any of the nonaggressive students, as again frequencies remained stable and well below cutoff levels.

Summary of Findings

In sum, the hypothetical judgments, teacher ratings, and office referrals for nonaggressive subjects remained relatively stable from pre- to post-intervention measurement. Experimental group aggressive subjects were most

likely to resemble nonaggressive subjects in their judgments for the ambiguous hypothetical scenarios at post-intervention. Further, experimental aggressives had by far the greatest proportion of clinically significant, reliable change in ratings of hypothetical scenario data. Among teacher ratings, changes in reactive aggression scores showed the greatest differences by group, again favoring the experimental group aggressive subjects. Mean differences in office referral change scores did not achieve statistical significance as a function of group membership; however, only experimental group aggressives demonstrated clinically significant change on this variable.

Discussion

Two of the three research questions have been clearly answered in the affirmative. All evidence indicates that participation in this program of intervention has no obvious negative effects on nonaggressive subjects. This finding is of importance when one considers the salient role played by nonaggressive peers in this treatment package for highly aggressive boys. Further, the overwhelming evidence of reductions in attributional bias among some aggressive subjects has been established with both statistical as well as clinical conventions. Conversely, some aggressive students demonstrated clinically significant, reliable increases in scores for the ambiguous scenarios. No experimental group aggressive subjects displayed increased ratings of attributions, anger, or behavioral choice. In contrast, 3 students (12.5 %) in the no-treatment control condition and 1 (4.5%) student in the attention only group displayed a heightened attributional bias, and each group also had one student whose ratings of anger increased. One student in the no-treatment group also increased in the amount of aggressive retaliation he favored in the ambiguous scenarios. These data suggest that participation in treatment may

actually combat a negative developmental progression in cognitive bias, rather than improve a static condition. Further, The presence of an attention-only comparison group suggests that the particular features of the attribution retraining program are responsible for the observed reduction in bias, rather than a "Hawthorne" effect resulting from special attention received from university personnel.

Attribution retraining appears to be one viable treatment option for the reduction of bias in aggressive male youth, although not all of the boys who participated in the attributional treatment displayed improvements. As with any intervention, individual differences make some children more likely than others to benefit from an attributional change program. Future research might refine sample selection techniques to best identify those students most likely to profit from participation. Along these lines, Dodge has suggested that a distinction should be made between children who are reactively aggressive (those who respond aggressively to perceived hostile provocation) versus proactively aggressive (those who instigate aggression without provocation), for it is only the former type of aggressive boy who is likely to benefit from an intervention focused on altering cognitions about peer provocation (Dodge, 1991; Dodge & Coie, 1987).

The behavioral indicators in the present study have also shown evidence, albeit weaker than cognitive indicators, of change. Teacher ratings show the strongest changes in reactive aggression, and this finding is not surprising given the specific intent of the intervention to address exactly that behavior. Teacher perceptions are of special concern given the significance of teacher ratings in identifying aggressive and inappropriate behavior in the schools. Teachers have the primary responsibility to identify and refer students both for available intervention programs and formal disciplinary action. Therefore, a

pupil's risk status relative to problem behaviors is highly dependent upon teacher perceptions of student behavior (Hudley, 1993). The significant reductions in teacher ratings of reactive aggression for the experimental subjects indicate that the intervention may be effective in moderating aggressive students' overall risk status.

Office referrals, the weakest of all the indicators of change incorporated into this study, demonstrate some treatment efficacy in the reduction of negative outcomes for aggressive students in that only treated subjects significantly reduced their frequencies of office referrals. However, students are typically referred to an administrator's office for a wide range of problem behaviors including not only aggression, but also vandalism, theft, deliberate disobedience, etc. The intervention package used in this study focuses on changing attributional beliefs regarding a peer's behavior. That such retraining efforts have not impacted other types of deviant behavior is not surprising. More sensitive indicators are necessary to accurately gauge the ability of interventions such as this to enhance specifically targeted behaviors. There is also a clear need for follow-up data which assess the longitudinal impact on behavior of this attributional change program.

As stated earlier, attribution retraining represents the initial phase in the construction of this treatment program for the reduction of peer directed aggression. As additional components are added, the magnitude of effects should be expected to improve. Attribution theory (Weiner, 1986) postulates a motivational sequence wherein social cognition impacts affect and together these determine behavioral responses. Such a sequence suggests that some form of anger coping (e.g., Lochman, Lampron, Gemmer, & Harris, 1987) should significantly enhance treatment strength in conjunction with attribution retraining. Though

no single intervention targeted to the level of individual functioning is presumed to be a panacea for behavior which is so clearly subject to multiple determinants, it can provide an individual with alternative ways of perceiving interpersonal situations, defining acceptable responses, and enacting appropriate behavior. The result might be reduced levels of aggression, which could enhance peer relations, school adjustment, and overall developmental outcomes for children at risk due to inappropriate aggression.

In addition to opening a new line of inquiry into the modification of peer directed aggression among children, this intervention study contributes valuable theoretical knowledge by directly examining the causal relationship between cognition and behavior. Research to date examining attributional bias and aggression has been correlational in nature and thus unable to specify a direction of effects. The research discussed here, in manipulating cognitive bias and identifying resultant changes in behavior more directly addresses the causal linkages postulated by attribution theory between controllability, intentionality, anger, and reactive aggression. The findings support a causal role for cognitive bias in the display of reactive aggression. Thus continued efforts to more effectively identify and reduce cognitive bias would likely serve the twin goals of increasing understanding of the fundamental causes of aggression and providing insights crucial to the design of effective interventions.

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Table 1

Mean Ratings of Intent, Anger, and Behavior as a Function of Intervention Group and Scenario Condition

	Causal Condition							
Group	Ambiguous		Prosocial		Hostile		Accidental	
Intent	PRE	POST	PRE	POST	PRE	POST	PRE	POST
All Nonaggres[a]	2.53$_a$	3.51$_a$	2.06	2.51$_{ab}$	6.31	6.05	2.37	1.63
Experiment[b]	5.31$_b$	2.63$_a$	2.55	2.05$_a$	6.04	6.81	2.11	1.65
AttenTrng[c]	5.18$_b$	5.21$_b$	2.65	3.10$_b$	6.21	6.40	2.59	2.07
NoAttCont[d]	4.63$_b$	4.69$_b$	2.22	3.14$_b$	6.43	6.32	2.53	2.09
Anger	PRE	POST	PRE	POST	PRE	POST	PRE	POST
All Nonaggres	3.61$_a$	4.00$_a$	2.97	2.47$_{ab}$	6.60	6.31	3.54	2.44
Experiment	5.51$_b$	3.39$_a$	2.50	1.78$_a$	6.75	6.78	3.22	2.25
AttenTrng	5.53$_b$	5.31$_b$	3.11	3.09$_{ab}$	6.71	6.57	3.52	2.32
NoAttCont	5.18$_b$	4.71$_b$	3.10	3.67$_b$	6.73	6.46	3.06	2.50
Behavior	PRE	POST	PRE	POST	PRE	POST	PRE	POST
All Nonaggres	3.23$_a$	3.26$_{ab}$	2.23	2.21	4.69	4.85$_{ab}$	2.66	2.64
Experiment	4.45$_b$	2.85$_a$	2.63	1.79	4.90	5.26$_a$	2.90	2.63
AttenTrng	4.23$_b$	3.81$_b$	2.60	2.36	4.96	4.96$_{ab}$	2.91	2.64
NoAttCont	3.81$_{ab}$	3.65$_b$	2.30	2.16	4.63	4.38$_b$	2.63	2.91

Note. Experiment, AttenTrng, and NoAttCont groups represent aggressive subjects only. Nonaggressives did not differ by group. Within variables, column means with different subscripts differ significantly at $p < .05$. Higher numbers indicate greater presumed hostile intent, reported anger, and retaliatory aggression.

[a]n=35 [b]n=20 [c]n=22 [d]n=24

Table 2

Frequency of Clinically Significant Improvement in Ambiguous Scenario Ratings as a Function of Intervention Group

	Ratings Type		
Group	Intent	Anger	Behavior
All Nonaggres[a]	0	1	0
Experiment[b]	12	4	4
AttenCont[c]	1	0	3
NoAttCont[d]	2	2	1

Note. Experiment, AttenTrng, and NoAttCont groups represent data for aggressive subjects only.

[a]n=35 [b]n=20 [c]n=22 [d]n=24

Table 3

Teacher Ratings of Behavior as a Function of Intervention Group

Intervention Group	Subscale			
	Total Aggression 8 items	Reactive Aggression 3 items	Prosocial Behavior 5 items	*School Behavior 4 items
All Nonaggresive	(n=35)			
Pre	14.44	6.14	16.97	10.47
Post	15.41	6.29	16.06	10.44
Experimental	Aggressive	(n=20)		
Pre	27.55	11.05	13.05	14.80
Post	24.05	9.55	14.65	14.40
Attention Only	Aggressive	(n=22)		
Pre	24.05	10.18	14.00	14.45
Post	26.23	12.27	14.73	14.82
No Att Control	Aggressive	(n=24)		
Pre	26.83	11.38	14.79	13.17
Post	25.71	11.13	15.62	12.17

Note. Nonaggressive subjects did not differ by group.

*Higher numbers indicate more negative school behavior.

Table 4

Frequency of Clinically Significant Improvement in Teacher Ratings of Behavior as a Function of Intervention Group

Group	Rating Subscale			
	Total Aggression	Reactive Aggression	Prosocial Behavior	School Behavior
All Nonaggres[a]	0	0	0	0
Experiment[b]	3	4	2	0
AttenCont[c]	1	0	0	0
NoAttCont[d]	2	2	2	0

Note. Experiment, AttenCont, and NoAttCont represent aggressive subjects only.

[a]n=35 [b]n=20 [c]n=22 [d]n=24